Innovative Approaches for Recycling Munitions Workshop

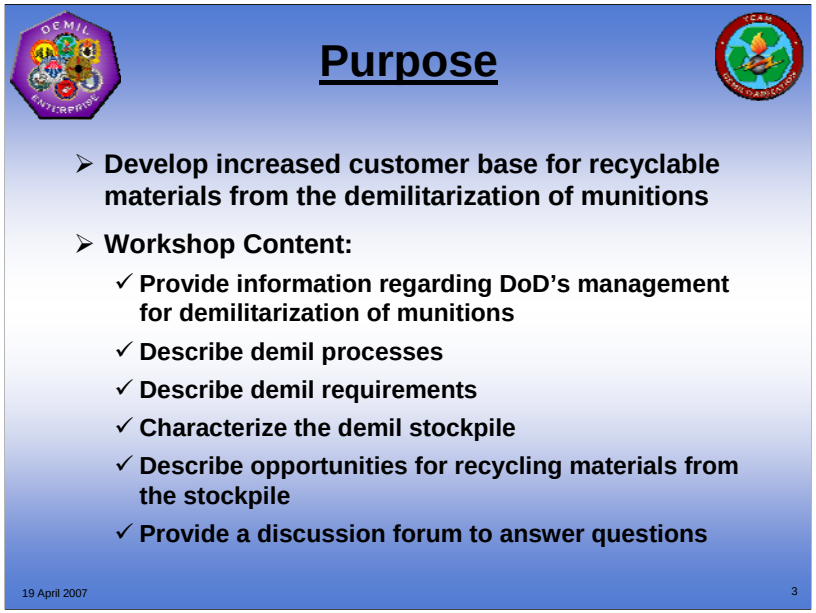
Mr. Jim Lawrence, ELG Metals:

- **Moderator**
- **Opening Remarks**

Mr. Barry Schaffer, Demil Metals, Inc:

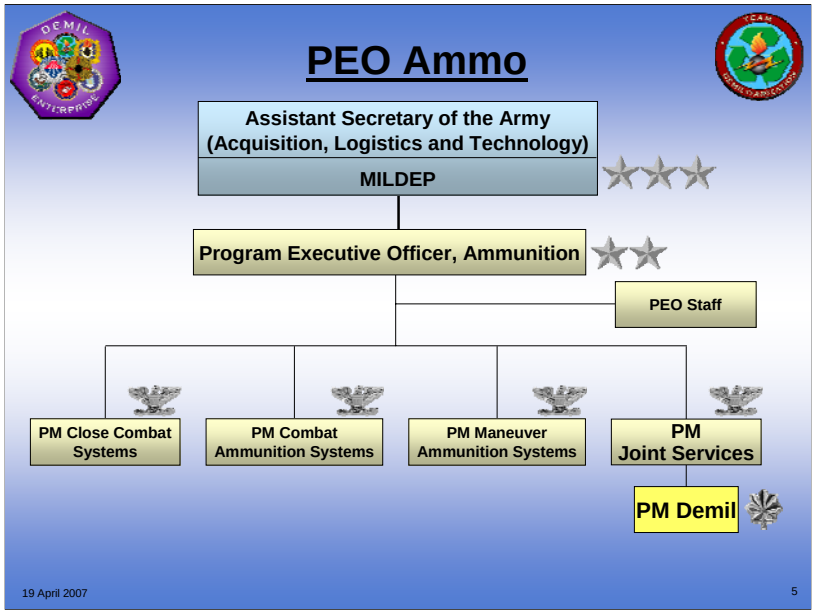
- **Speaker Introduction**

Good Morning – and thanks for attending our workshop and allowing us to share one of our greatest challenges; how to reduce the large and growing stockpile of munitions that have been designated for demilitarization.

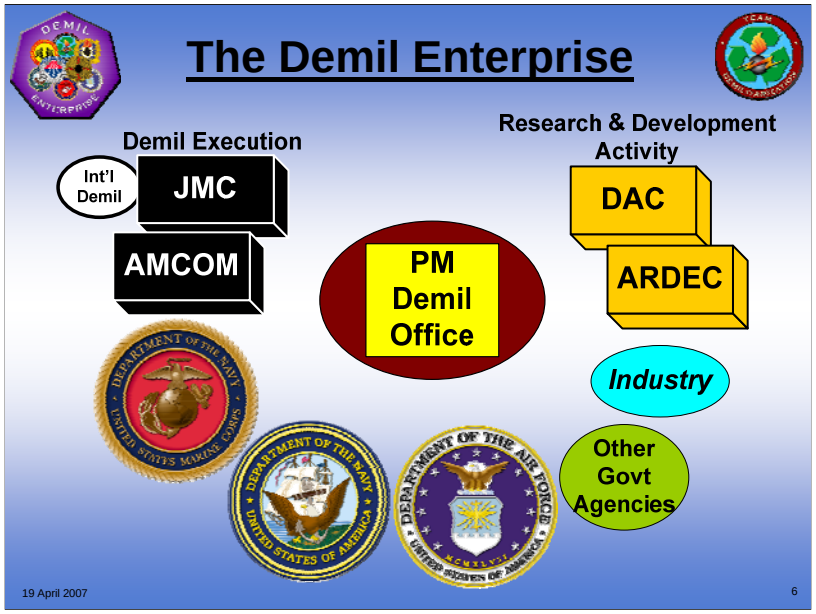


Our purpose for this workshop is to provide information about munitions demilitarization and to create an open forum to gain your insight into what we may do to better support the scrap industry and answer your questions.

The Department of Defense has designated the Secretary of the Army as the Single Manager of Conventional ammunition (SMCA). As the SMCA, The Army is responsible for funding and executing DOD's conventional ammunition requirements and specifically for this forum, the demilitarization of conventional ammunition for all the Military Services. Execution responsibility is delegated to the Program Executive Officer, Ammunition, MG Paul Izzo, located at Picatinny Arsenal, NJ. For the purpose of demil, Conventional Ammunition includes tactical missiles.



This org chart shows the PEO Ammunition, the organizations that develop and procure new munitions products, and the Joint Services organization that my office is part of. The Joint Services group manages activity that supports all the Military Services.



The Product Manager Demil Office has a strategic-level management responsibility for munitions demilitarization – planning, budgeting, funding, and execution. Execution is accomplished through an extended matrix of resources that includes a diverse group of people, locations, and infrastructure. This collection of organizations is known as the "Demil Enterprise".

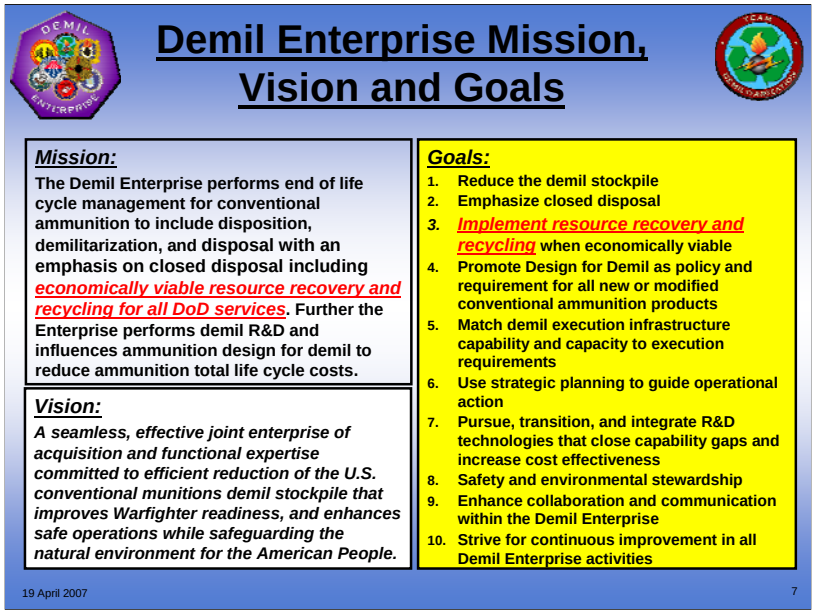
JMC is the Joint Munitions Command located at Rock Island Arsenal, IL.

AMCOM is the Aviation and Missile Command at Redstone Arsenal, Huntsville, AL

DAC is the Defense Ammunition Center at McAlester, OK.

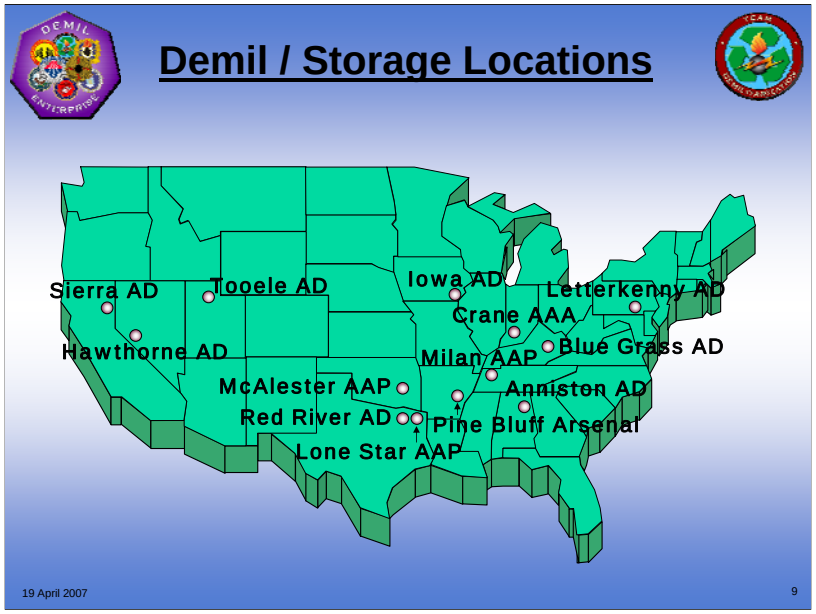
ARDEC is the Armament Research, Development and Engineering Center at Picatinny Arsenal, NJ.

Each of the military Services is also represented in the Demil Enterprise organization.

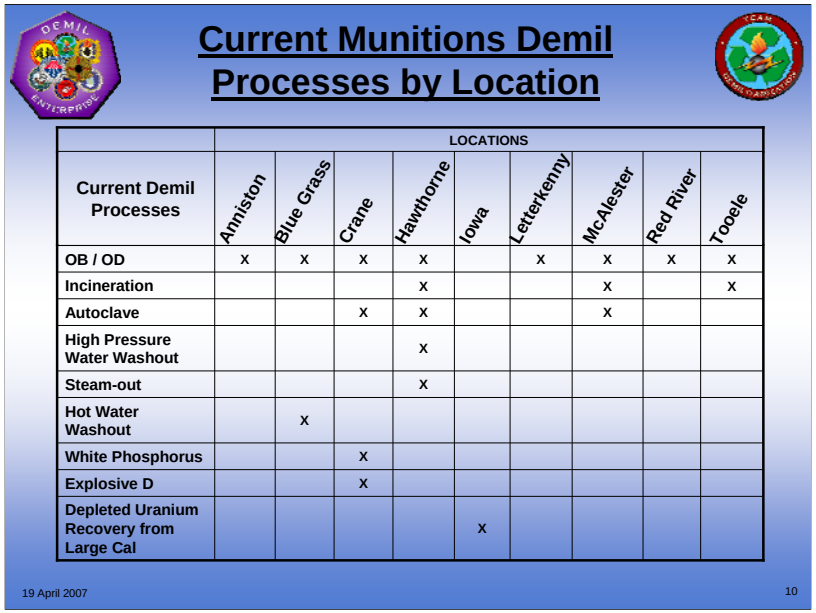


The Demil Enterprise has established a formal mission statement and 10 specific performance goals. Note the prominence of resource recovery and recycling in our mission as well as our goals. Goal #1 is most important: Reduce the demil stockpile. So far we are not doing well in that area.

Each of the services initiates a formal transfer of ownership when products are put in the demil stockpile. You could say that we manage DOD's conventional ammunition scrap yard. These are the major types of products that comprise the demil stockpile. You can imagine the types of scrap that demilitarization of these products would generate. I will provide more technical information later in the briefing.



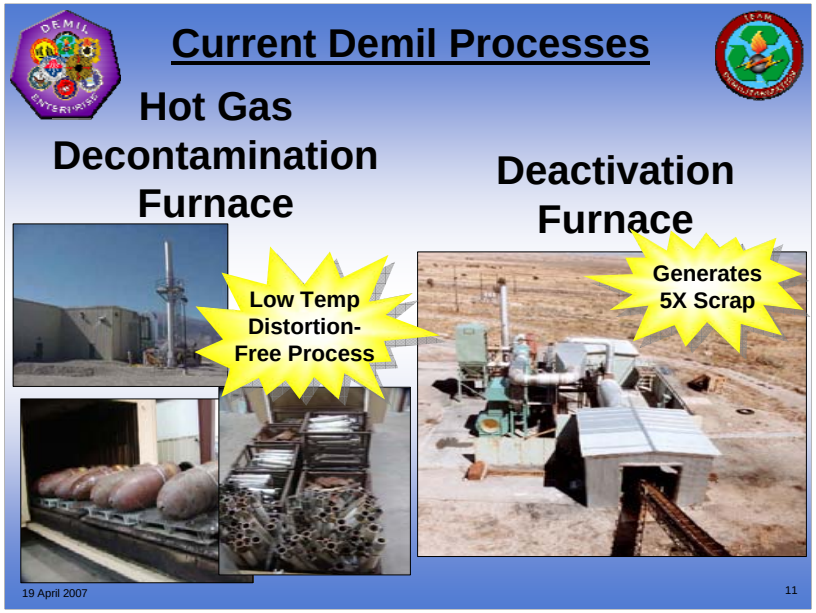
This map shows the domestic storage locations for the demil stockpile. As you can see, they are spread across the United States.



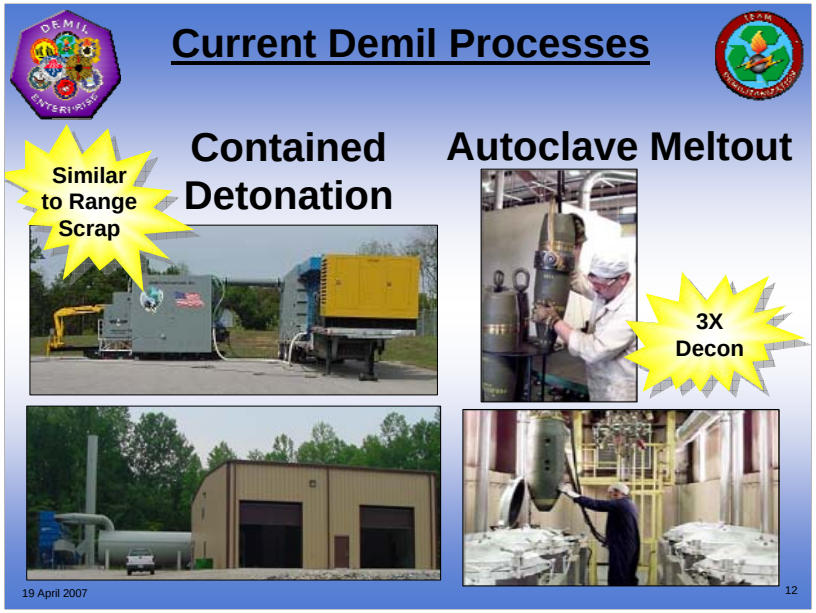
Current Munitions Demil Processes by Location

Current Demil Processes	LOCATIONS								
	Anniston	Blue Grass	Crane	Hawthorne	Iowa	Letterkenny	McAlester	Red River	Tooele
OB / OD	x	x	x	x		x	x	x	x
Incineration				x			x		x
Autoclave			x	x			x		
High Pressure Water Washout				x					
Steam-out				x					
Hot Water Washout		x							
White Phosphorus			x						
Explosive D			x						
Depleted Uranium Recovery from Large Cal					x				

Many of the storage locations are also operational sites where demil “execution” is performed. This chart shows some of the primary processes, by site, that are used to achieve demilitarization and generate our scrap. In the past there has been a heavy dependency on “open burn/open detonation” as a process for demilitarization. Although quite effective and cost efficient, environmental compliance issues are forcing a change to “closed disposal” processes that are significantly more expensive.

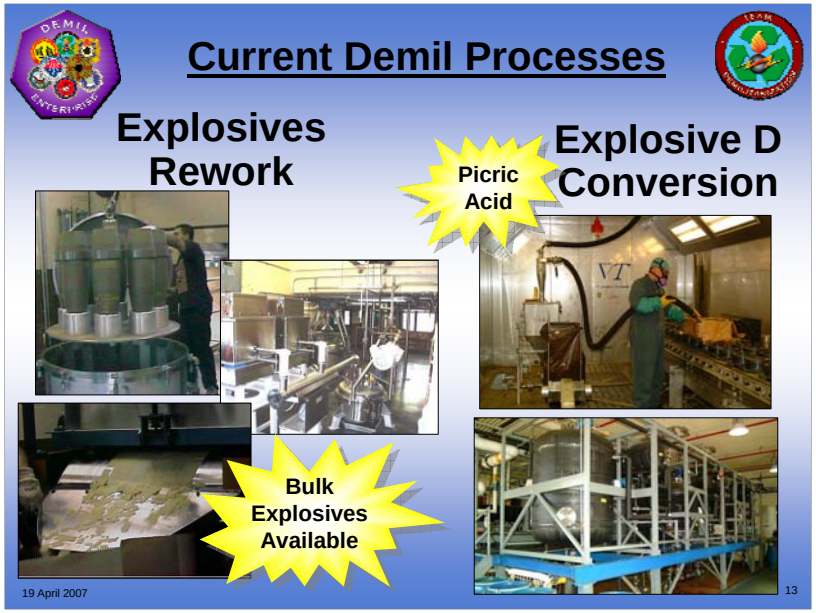


The Hot Gas Decontamination Furnace is used for both range and demil scrap processing at Hawthorne. Along with the Deactivation Furnace, these processes are used to remove traces of explosive from the scrap. Deactivation Furnaces are located at Crane AAA, McAlester AAP, Tooele AD, Japan.



Another demil process for small explosive components is “contained detonation” technology. This is a niche technology for small items that are generated from disassembly and is not intended for large production throughput. A transportable unit is located at Anniston Defense Munitions Center. Stationary units are located at Crane Army Ammo Activity (CAAA) and Blue Grass Army Depot (BGAD).

The autoclave process is well established and typically used to melt out the explosive material from artillery shells and bombs for either reuse or donor material. This process capability is located at Hawthorne AD, McAlester AAP, Egypt, Korea.



At MCAAP, we have developed a capability to rework the recovered TNT to bring it back up to spec grade and reused. Melted-out TNT is re-flaked to be recycled into new munitions.

Another removal and conversion process being developed is the washout of Explosive D (Ammonium Picrate) from projectiles and converting it to Picric Acid for commercial sale. Explosive D is difficult to process and this provides an effective alternative to open detonation. Location- Crane AAA.

Current Demil Processes as a Source of Supply

TOW Missile Components:

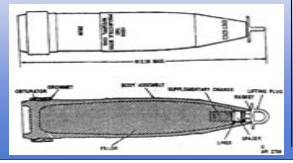
- Missile Case (FMS & US Production - 15K)
- Operation Iraqi Freedom (Retrograde Use)
  - Foam Cushion
  - End Caps
- Potential Reuse:
  - Launch Motor Nozzle
  - Coated Launch Motor Case

TNT:

- 17M lb Dept of Defense requirement thru FY05
- As of March 05, 13.4M lbs used/available

Supplementary Charges:

- 8" & 105mm ammo reused in new 155mm (M795 & M107) & 105mm (M927) projectiles



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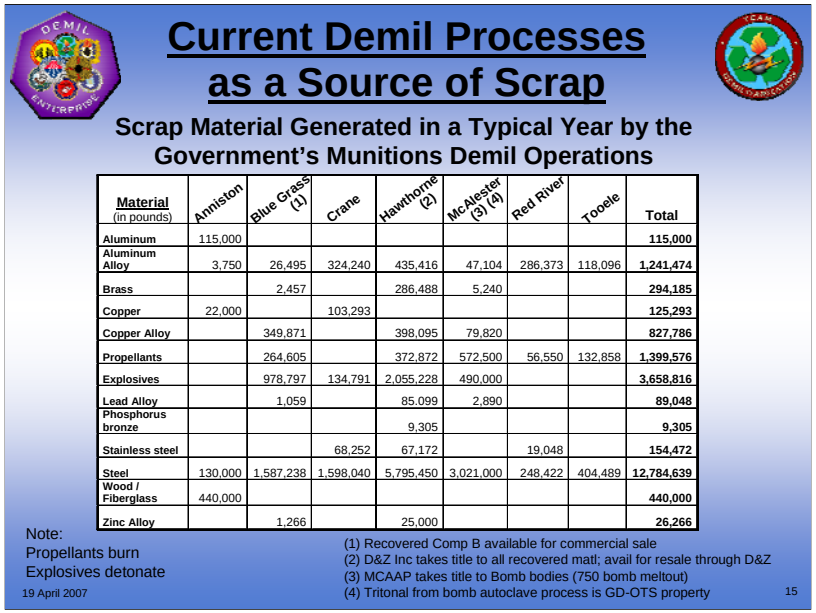
Depleted Uranium Penetrators:

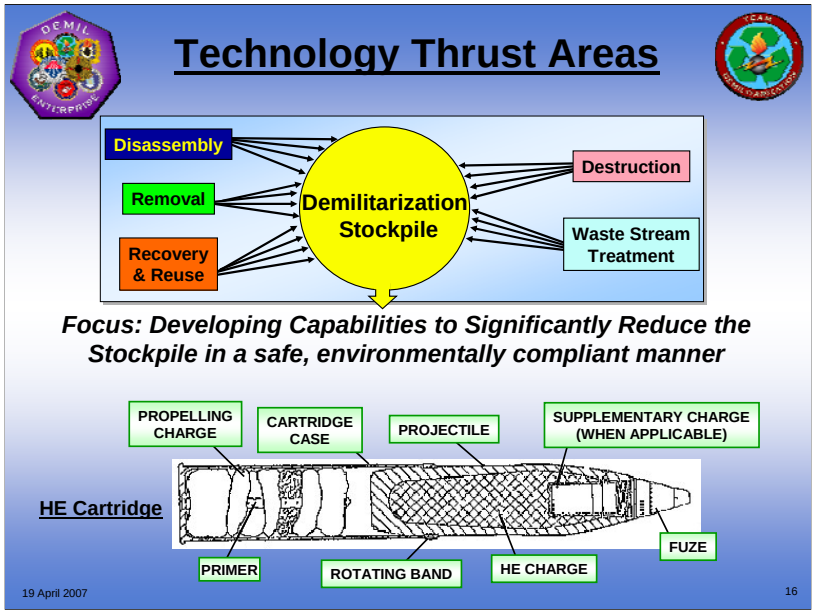
- Reused in new M829A3 120mm tank & M919 25mm cartridges
- Approximately 137K in Demil account

M829 120mm Armor Piercing, Fin Stabilized, Discarding Sabot-Tracer (APFSDS-T) cartridge with DU penetrator

Some of the products and materials that result from the current demilitarization processes are suitable for reuse. We call this a "source of supply" as it provides components for the production of new munitions.

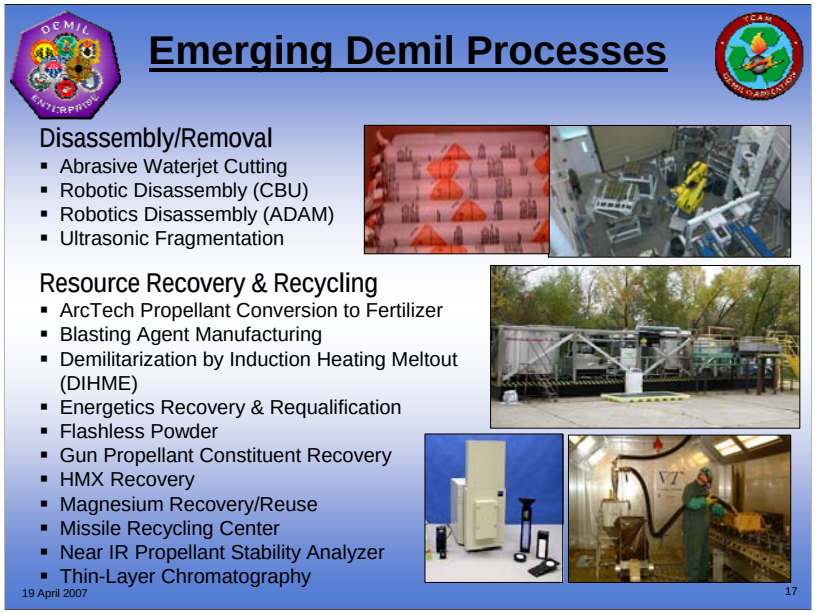


Materials that are not reusable within the government are considered scrap and are available for sale or disposal. This chart shows some of the more common materials that result from current processes for demilitarization. The quantities shown are for a typical year at our current level of activity and processing. These quantities are "organic" generations and do not include scrap generated by commercial demil operations that are contracted by the government to perform munitions demil.



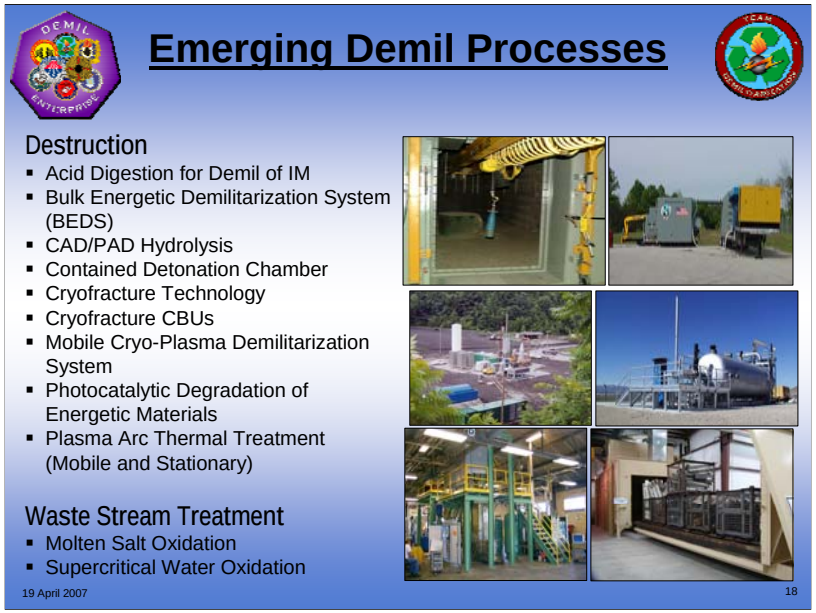
Because there is such a wide variety of ammunition assembled using a variety of methodologies with a variety of explosive fills, the enterprise must explore numerous technologies to address complete demilitarization of a munitions item. In order to get our arms around this challenge, development efforts have been broken up into thrust areas. Unfortunately, there is no silver bullet for the demil of all munitions items, and in most cases, there isn't even a single silver bullet for the demil of one munition item. It takes one or more of the thrust areas to provide complete demilitarization.

To gain a better appreciation of why there is no silver bullet for all munitions, A relatively simple, typical projectile has several components involved. Over a decade ago, we would have mostly addressed demilitarization with open burning and open detonation. Our focus now is to look for closed disposal methods (any method other than OB/OD) to not only comply with more stringent environmental guidance, but to also recovery and/or reuse any component with a justifiable value.



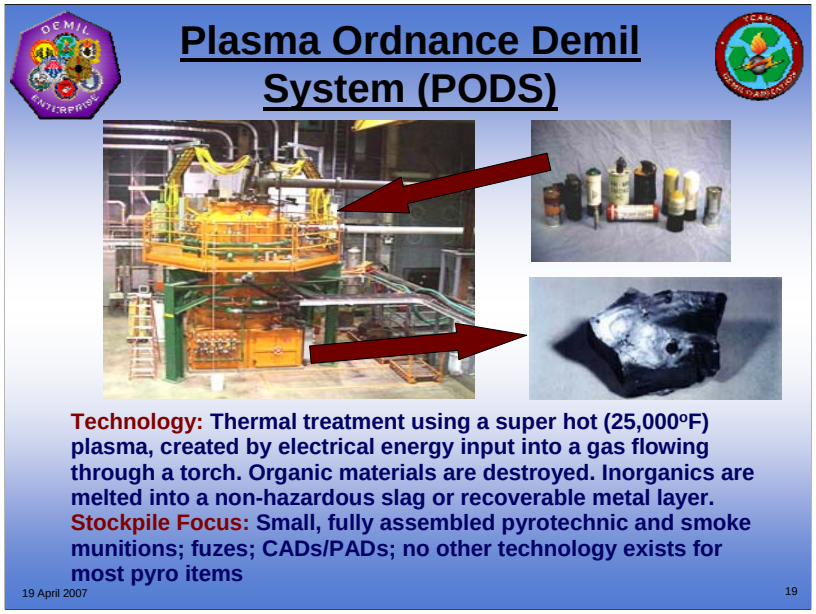
The emphasis on “closed disposal” has caused the government to make major investments in new technology for demilitarizing munitions. The next two charts highlight some of these emerging technologies and their area of application; “Disassembly Processes”, “Resource Recovery and Recycling”, and

(next chart)



"Destruction". Additionally, several technologies are aimed at "Waste Stream Treatment".

The reason for showing these emerging technologies to you is to possibly stimulate your thinking about how these processes may relate to operations in your industry and the disposition of the "scrap" materials that result.



We are aware of plasma incineration activity within the commercial sector and expect you may have knowledge of this process and how to dispose of the resulting waste.

Mobile Plasma Treatment System (MPTS)

Technology: Thermal treatment using a super hot (25,000°F) plasma, created by electrical energy input into a gas flowing through torch. Organic materials are destroyed. Inorganics are melted into a non-hazardous slag or recoverable metal layer.

Stockpile Focus: Small, fully assembled pyro and smoke munitions; CADs; PADs; Fuzes

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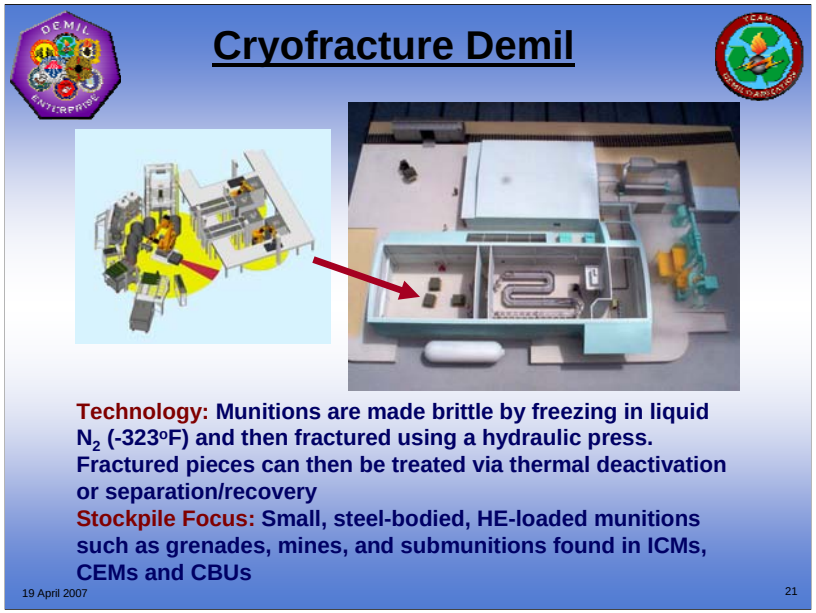
This is a version of the plasma incinerator that can be relocated among the sites where munitions are stored, avoiding the hazards and expense of transportation.



Similarly, we are aware that cryofracture is used in your industry. After a thermal deactivation process, the resulting material is demilitarized scrap.

Emerging Demil Processes by Location

Emerging Demil Processes	LOCATIONS								
	Anniston	Blue Grass	Crane	Hawthorne	Iowa	Letterkenny	McAlester	Red River	Tooele
Contained Burn of Rocket/Missile Motors				X					
Missile Recycling Center	X								
Plasma Ordnance Destruction System				X					
Base Hydrorolysis									X
Cryofracture with Incineration							X		
Propellant to Blasting Slurry Conversion	X			X					
Propellant to Fertilizer Conversion			X			X			
Detonation Chamber	X	X	X						
Molten Salt Oxidation		X							
CBU Cryofracture				X					
Mobile Plasma Treatment System			X						
MG Recovery			X						

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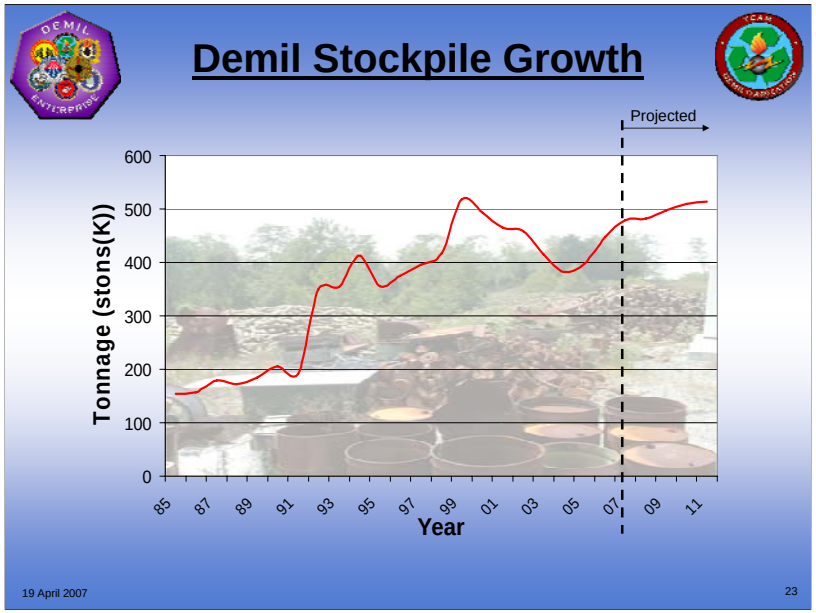
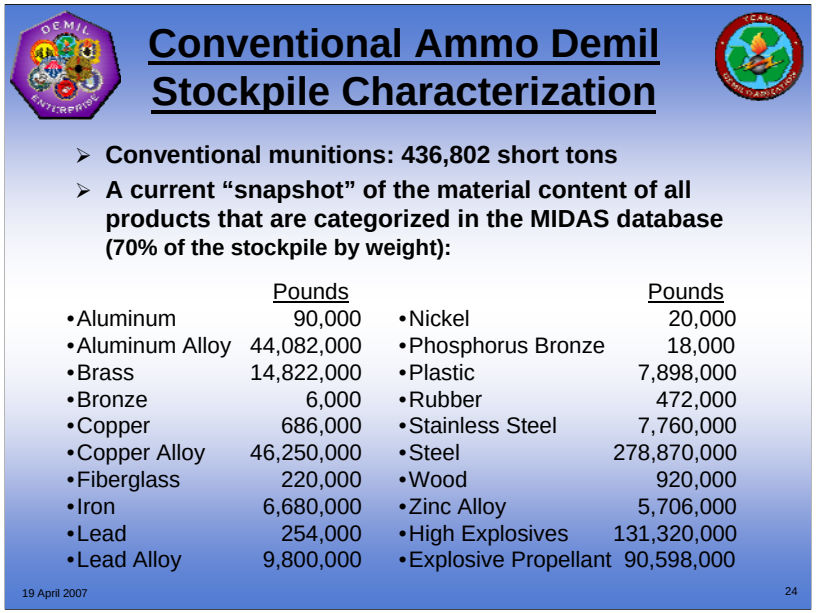
This chart shows some of the “emerging” demil processes and the locations where they may be located.



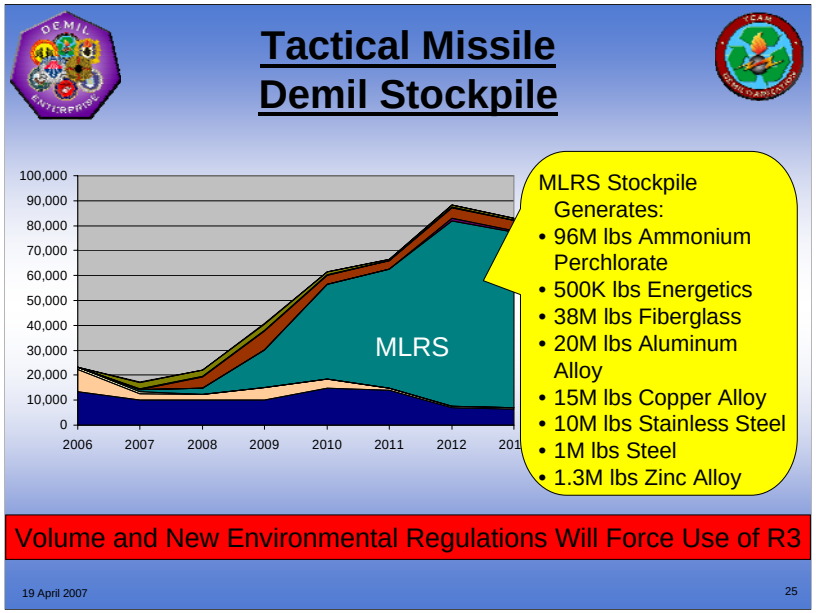
Remember the #1 goal for the demil enterprise - “reduce the demil stockpile”. This chart shows the historical trend of the size of the conventional ammunition stockpile. We are approaching 500,000 short tons.



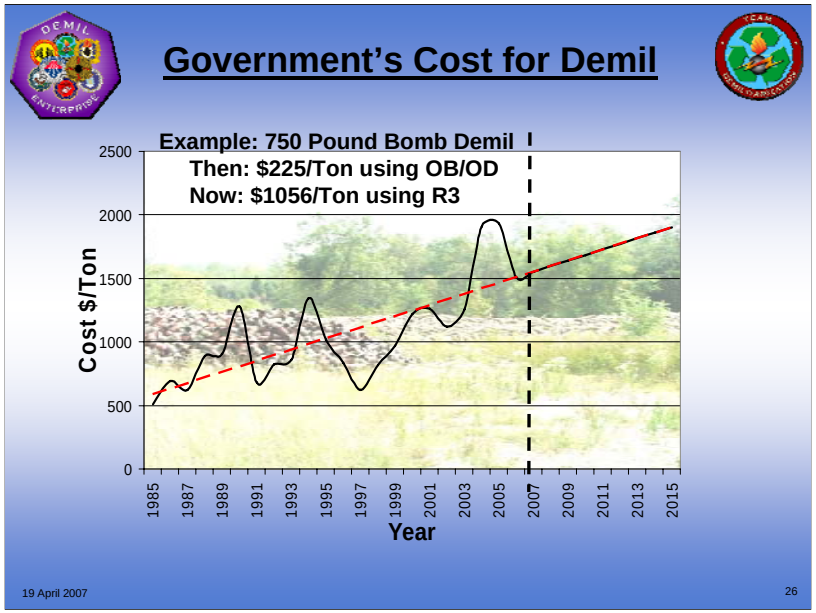
These numbers don't include packing material – for example: ammo cans, pallets, prop charge cans

We use a database called MIDAS, "Munitions Items Disposition Action System", to maintain and communicate the characteristics of the products in the demil stockpile. Any process used for destruction must consider what happens to all the constituent materials during processing and their eventual disposal. Along with that purpose, the database is capable of sorting in a manner that tells us the material makeup of the stockpile as a whole.

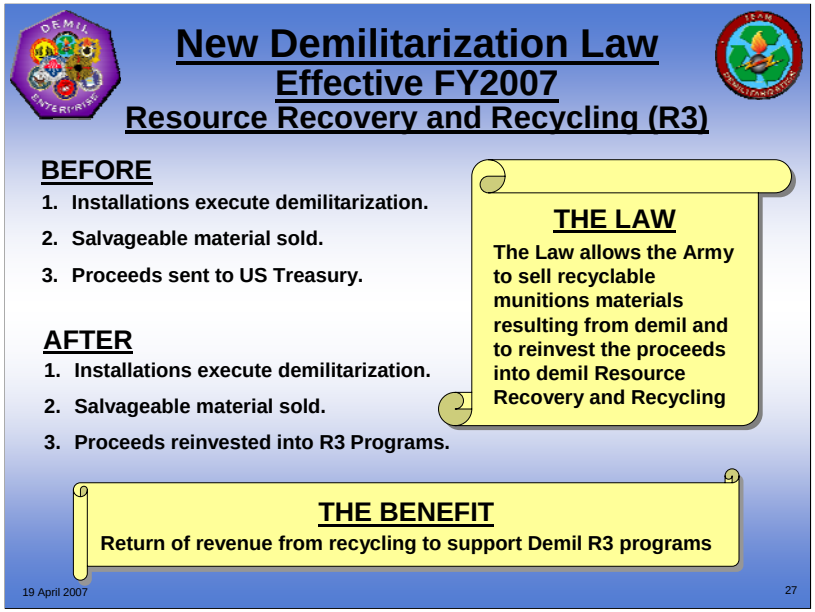
This slide is a "snapshot" of the current demil stockpile for conventional ammo. MIDAS data comprises roughly 70% by weight of the conventional ammo demil stockpile



It is apparent that we are in for a surge due to MLRS rockets reaching their design shelf-life that will require timely disposal to avoid safety issues. We've tried to represent the impact of this major demilitarization for MLRS rockets by showing the expected total recyclable materials from that effort.

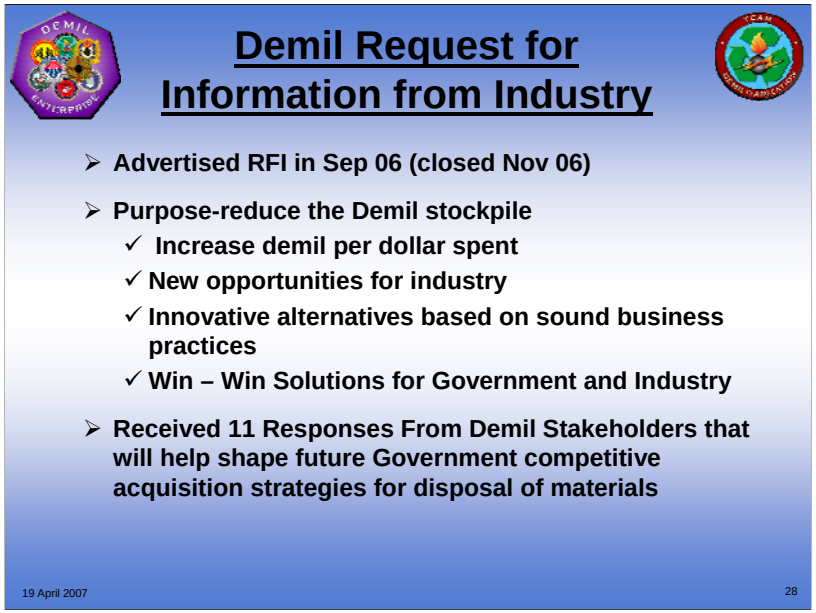


Legacy demil relied on open burn / open detonation. Closed disposal requirements and inflationary pressures have caused an upward trend for the cost of demil. In the future, due to policy and regulations, demil will be going to higher level of R3 and thus will be more expensive on a per-unit basis.



Before FY07, proceeds from the sales of recycled material by DRMOs were returned to the US Treasury. Beginning in FY07, proceeds will be deposited into an Army Demilitarization Account to be used to support R3 Programs. PM-Demil will manage the financial records and approve all distributions from the account.

Operational installations will now have an incentive to develop cost effective processes for the disposal of scrap. This is a major change in the business model that is intended to help address the funding shortfall for munitions demil. We are looking for ideas on how to maximize return on our scrap.

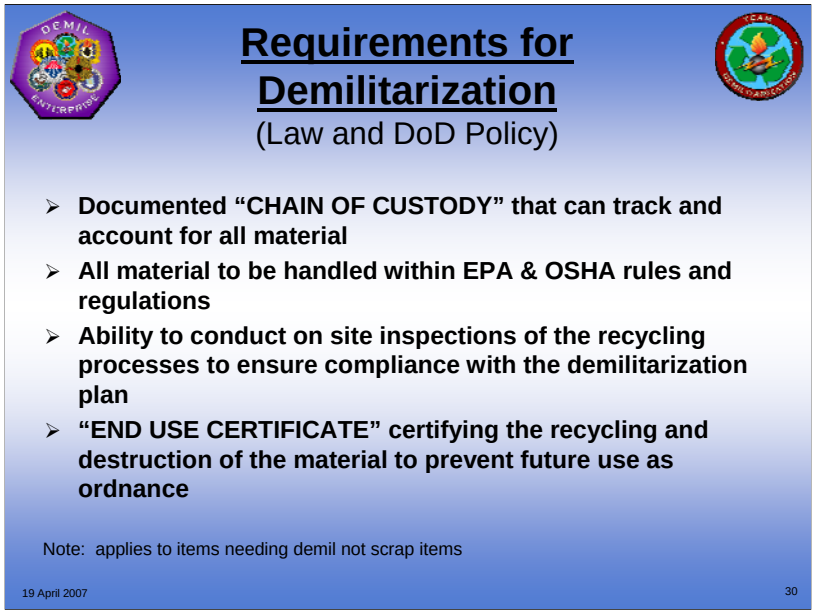


Although the return of revenue from scrap sales will help our problem, it is not a complete solution.

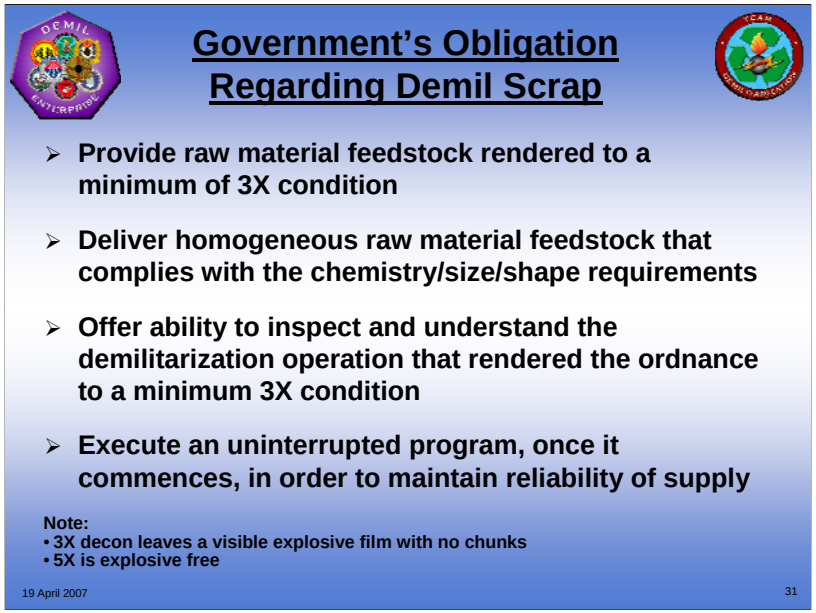
In the fall of 2006, we advertised a call for Industry input of innovative approaches for reduction of the demil stockpile. Responses came from many of the stakeholders in the current ammunition industry, but none from external industry, such as yourselves.

We believe the demil stockpile has inherent value, and with the application of new and innovative approaches, we could increase the rate at which we dispose of these products. Our goal is to reduce the stockpile by 6% annually. We would welcome your input of ideas to complement those received from the ammunition community.

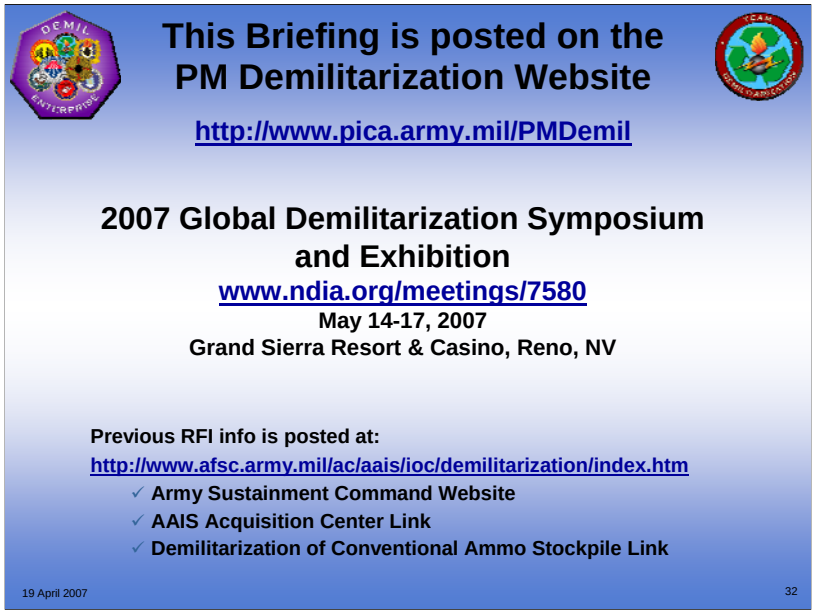
This chart shows some of the areas that we feel additional input would be of value.



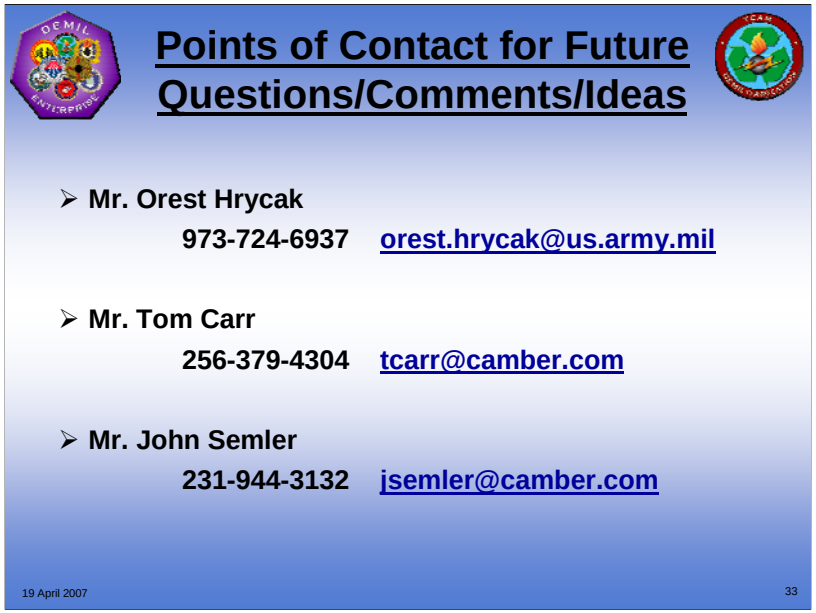
Some of you may already have experience dealing with the demilitarization process and will recognize these requirements. In most cases, these requirements apply to the government's internal operations for demilitarizing munitions. In some cases this work is performed by contractors.



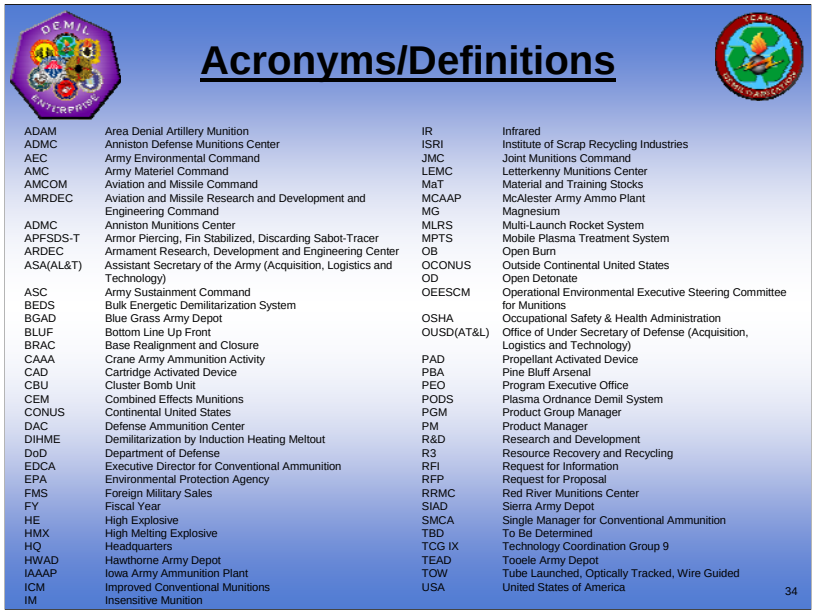
We recognize that to gain confidence and interest in our product, government must consider your business requirements. “3X condition” means that the item has been completely demilitarized but scrap material could still contain traces of explosive residue and requires scrap recyclers to be certified to handle 3X.



If you desire future reference to this briefing, it is posted at this web site.



Hopefully we have stimulated your thinking which may result in future questions. Please feel free to contact any of these folks, who, acting as my representative, will see that you get a response that suits your need and our ability to provide the information. Orest is on our panel and Tom and John are in attendance.



Much of government is acronyms – here is some help.

We are now open for comment and questions. Our panel consists of:

- Mr. Orest Hrycak who has a background in munitions engineering,
- Mr. Barry Schaffer who has experience in your industry with munitions scrap recycling and
- Myself, LTC Brian Raftery, PM Demil.

We would like to make this session completely informal to encourage your participation. Jim Lawrence will try to maintain control by recognizing the speaker and directing the discussion.